

## REMARKS/ARGUMENTS

These Remarks are responsive to the final office action mailed August 8, 2006 ("Office Action") in the above-referenced application. Claims 1 and 3-20 are currently pending. No claims have been amended in connection with this Response. Applicant respectfully requests reconsideration of the rejection of claims 1 and 3-20 for the following reasons.

The present invention is directed to a catalyst for conversion of N<sub>2</sub>O. Specification, ¶ [002]. The catalyst comprises ferrierite/iron assaying from 1 to 6% iron by weight in ion exchange position, with a potassium ion content in exchange position from 0.1-0.5%. Specification ¶¶ [011]-[013].

### Statement of Substance of Interview

In accordance with 37 C.F.R. § 1.133 and M.P.E.P. § 713.04, Applicant herein provides a summary of the in-person interview between the undersigned and Examiner Johnson, which occurred on November 21, 2006. During the interview, the undersigned presented a copy of the declaration attached hereto as Appendix A, and stated reasons that the claimed catalysts show unexpected results. The examiner explained his position with respect to the rejections of record as set forth in the Interview Summary.

### Obviousness -- 35 U.S.C. § 103

It is well established under 35 U.S.C. § 103 that before a *prima facie* case of obviousness can be established, the *Graham v. John Deere* factors must be addressed. M.P.E.P. § 2141(I) states:

Patent examiners carry the responsibility of making sure that the standard of patentability enunciated by the Supreme Court and by the Congress is applied in each and every case. The Supreme Court in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966), stated:

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as

commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquires may have relevancy. . .

“To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.” M.P.E.P. § 2143.03.

### **Lack of *prima facie* obviousness in view of Farnos**

The Office Action rejects claims 1 and 3-20 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,589,147 (“Farnos”).

The Office Action states that Farnos “discloses a catalyst for reduction of NO<sub>x</sub> . . . comprising ferrierite, zeolite (see column 6, lines 58-63), and about 2% iron (see column 9, lines 25 and 36-39).” Office Action, page 3. Applicant notes that Farnos teaches a broad array of possible catalyst materials and that the “molecular sieve . . . is not limited to any particular molecular sieve material. . . .” Farnos, col. 6, ll. 50-52. Moreover, Applicant notes that Farnos teaches metal loading by simply mixing the catalyst with metal in a miller (*see* col. 9, ll. 21-43; Example 1, col. 11, ll. 5-16), rather than incorporating iron in ion exchange position as required by the claims. The examiner relies on Farnos’ disclosure at column 10, lines 6-9 to meet the limitation relating to potassium. In this regard, Farnos states:

If desired, alkali metals or alkaline-earth metals, including sodium, potassium, rubidium, cesium, magnesium, calcium, and barium, may also be present in the catalyst or may be added to the catalyst.

Farnos, col. 10, ll. 6-9. Applicant notes that the disclosure of alkali metals relied on by the examiner appears to be related to the “metal loading” as it appears after the list of “Metal oxides useful in this invention.” *See* Farnos, col. 9, l. 21 to col. 10, l. 9. With respect to the level of potassium required by the claims, the Office Action states that it “would have been obvious to

optimize the amount [of potassium] to 0.1-0.5%, through routine experimentation.” Office Action p. 3.

Claim 1 requires, in addition to the ferrierite/iron and other limitations, “0.1 to 0.5% of potassium by weight in ion exchange position.” The potassium in ion exchange position results from potassium being exchanged for iron in the process of making the claimed composition. *See* Declaration, ¶ 7 and Specification, ¶¶ [011]-[013]. In contrast, Farnos appears to teach potassium as a possible component of a mixture with the catalyst support. Nothing in Farnos teaches or suggests the combination of iron and potassium in ion exchange position as claimed. In fact, Farnos merely teaches that “[i]f desired, . . . potassium . . . may also be present in the catalyst or may be added to the catalyst.” Farnos col. 10, ll. 6-9. The Office Action therefore fails to provide any motivation, suggestion, or teaching for arriving at the claimed amount of potassium in ion exchange position. Accordingly, the Office Action has failed to establish a *prima facie* case of obviousness.

Claim 1 requires, among other limitations, “a ferrierite/iron assaying from 1 to 6% of iron by weight in ion exchange position.” In Farnos, the iron teaching relied on by the examiner is mixed with the catalyst support and is therefore not in “ion exchange position” as claimed. The examples of Farnos clearly teach that iron is added and mixed in a muller. *See, e.g.*, Farnos, Example 2, col. 11, ll. 19-30. In contrast, the iron in ion exchange position in the present invention results from potassium being exchanged for iron in the process of making the claimed composition. *See* Declaration, ¶ 7 and Specification, ¶¶ [011]-[013]. Nothing in Farnos teaches or suggests “a ferrierite/iron assaying from 1 to 6% of iron by weight in ion exchange position.” The Office Action therefore fails to provide any motivation, suggestion, or teaching for arriving at the claimed amount of iron in ion exchange position. Accordingly, the Office Action has failed to establish a *prima facie* case of obviousness.

Finally, Farnos merely teaches a broad array of possible catalyst materials and even states that the “molecular seive . . . is not limited to any particular molecular sieve material. . . .” Farnos, col. 6, ll. 50-52. Ferrierite is not described in any of the examples of Farnos, nor does it appear to be claimed by Farnos. Additionally, Farnos includes within its extensive lists other support materials such as mordenite (*see* Farnos, col. 6, ll. 61-63), which Applicant has shown to be inferior relative to the claimed composition (*see* Unexpected Results, below). “When

evidence of secondary considerations such as unexpected results is initially before the Office, for example in the specification, that evidence should be considered in deciding whether there is a *prima facie* case of obviousness.” M.P.E.P. § 2144.08. Indeed, in order to arrive at the claimed invention from the teaching of Farnos, one of ordinary skill in the art would have had to choose the claimed components from three separate lists of components and then would have had to also select the particularly claimed components in the amounts claimed. This extensive amount of selection that would have been required only buttresses the nonobviousness of an invention directed to catalysts--long recognized to be an unpredictable art. *See In re Mercier*, 185 USPQ 774, 779 (CCPA 1975) (“The conclusion that appellant’s invention would have been nonobvious to one having ordinary skill in the art on the basis of the cited art is further buttressed by the fact that the claimed invention is a catalytic process. The unpredictability of catalytic phenomena has long been recognized by this court.”). In order to sustain a *prima facie* case of obviousness, the Office Action must set forth a “reasonable basis in the prior art to make the selection claimed here,” *In re Grasselli*, 218 USPQ 769, 774 (Fed. Cir. 1983), which has not been done. Thus, the Office Action fails to establish a *prima facie* case of obviousness of the claimed invention.

For all the foregoing reasons, the Office Action fails to set forth a *prima facie* case of obviousness of claim 1 in view of Farnos. Claims 3-20 are likewise unobvious as they depend from and incorporate the limitations of claim 1. Accordingly, the rejection of claims 1 and 3-20 under 35 U.S.C. § 103 in view of Farnos are improper and must be withdrawn.

#### **Lack of *prima facie* obviousness in view of Ward**

The Office Action rejects claim 1 under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 4,002,575 (“Ward”). Applicant respectfully traverses.

Initially, Ward is directed to rejuvenation of hydrogenation, hydrocracking isomerisation, or reforming catalyst, while the present invention is directed to a “catalyst for conversion of N<sub>2</sub>O.” Ward is therefore outside of the field of endeavor of, and is directed to different problems than, the present invention. “In order to rely on a reference as a basis for rejection of an applicant’s invention, the reference must either be in the field of applicant’s endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned.” M.P.E.P. § 2141.01(a) (quoting *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445

(Fed. Cir. 1992). Accordingly, the rejection of claim 1 as obvious in view of Ward is improper and must be withdrawn.

As with Farnos, Ward merely teaches a broad array of possible catalyst materials. Ferrierite is not described in any of the examples of Ward. Moreover, Ward includes within its extensive lists of possible supports other support materials such as mordenite (*see* Farnos, col. 6, ll. 61-63), which Applicant has shown to be inferior relative to the claimed composition. (*see* Unexpected Results, below.) “When evidence of secondary considerations such as unexpected results is initially before the Office, for example in the specification, that evidence should be considered in deciding whether there is a *prima facie* case of obviousness.” M.P.E.P. § 2144.08. Indeed, in order to arrive at the claimed invention from the teaching of Ward, one of ordinary skill in the art would have had to choose the claimed components from three separate lists of components and then would have had to also select the particularly claimed components in the amounts claimed. This extensive amount of selection that would have been required only buttresses the nonobviousness of an invention directed to catalysts--long recognized to be an unpredictable art. *See In re Mercier*, 185 USPQ 774, 779 (CCPA 1975) (“The conclusion that appellant’s invention would have been nonobvious to one having ordinary skill in the art on the basis of the cited art is further buttressed by the fact that the claimed invention is a catalytic process. The unpredictability of catalytic phenomena has long been recognized by this court.”). In order to sustain a *prima facie* case of obviousness, the Office Action must set forth a “reasonable basis in the prior art to make the selection claimed here,” *In re Grasselli*, 218 USPQ 769, 774 (Fed. Cir. 1983), which has not been done. Thus, the Office Action fails to establish a *prima facie* case of obviousness of the claimed invention.

#### **Unexpected results relative to Farnos and Ward**

As discussed briefly above, the Office Action has *completely* ignored experimental evidence of unexpected results contained in the specification. “When evidence of secondary considerations such as unexpected results is initially before the Office, for example in the specification, that evidence should be considered in deciding whether there is a *prima facie* case of obviousness.” M.P.E.P. § 2144.08. “A showing of unexpected results must be based on evidence, not argument or speculation. *In re Mayne*, 104 F.3d 1339, 1343-44, 41 USPQ2d 1451,

1455-56 (Fed. Cir. 1997) (conclusory statements that claimed compound possesses unusually low immune response or unexpected biological activity that is unsupported by comparative data held insufficient to overcome prima facie case of obviousness).” M.P.E.P. § 2144.08.

Ward and Farnos each disclose examples of certain zeolite catalysts outside the scope of the claimed invention. The Examiner relies on the general disclosure in each reference which includes lists of compounds that are useful components of zeolite catalysts. The Examiner considered the claimed invention obvious based on selection of the components of the claimed catalysts from the lists disclosed in Ward and Farnos. Such rationale would indeed suggest that each of the compositions that can be constructed from the list of components in Ward and Farnos would have identical properties. However, Applicant, in contrast to the very general teachings of Ward and Farnos, demonstrates in the specification that the claimed catalysts unexpectedly show significantly higher catalytic performances with respect to prior art catalysts in the selective treatment of N<sub>2</sub>O in particularly difficult catalytic conditions (high temperature, in the presence of water vapor and NO<sub>x</sub>). Applicant respectfully submits a Declaration signed by the inventor attesting to the higher catalytic performance of the claimed catalysts.

Applicant has shown, for example, that compared to other zeolites, the claimed compositions have unexpected catalytic activity for selective conversion of N<sub>2</sub>O in the presence of water vapor relative to four typical zeolite catalysts (Y, Pentasil, Beta, and Mordenite). Declaration, ¶ 12 and Example 4, Specification ¶ [044]. In example 5, the catalysts of the present invention again show an unexpectedly higher activity for the conversion of N<sub>2</sub>O in a gas mixture having a high N<sub>2</sub>O concentration than the mordenite/iron combination, particularly at higher temperatures and in the presence of minor concentrations of NO<sub>x</sub> (NO). Declaration, ¶13 and Example 5, Specification ¶¶ [046]-[049]. Example 6 further demonstrates higher hydrothermal stability in the claimed catalysts than the mordenite/iron catalyst at high temperature and in the presence of water vapor. Declaration, ¶ 14 and Example 6, Specification ¶¶ [050]-[053]. These examples individually and collectively demonstrate unexpected results of the claimed catalysts relative to the broad genus of zeolite catalysts shown in Ward.

Apparently in response to Applicant’s argument that the claimed catalyst has unexpected advantages, Office Action, at page 6, states:

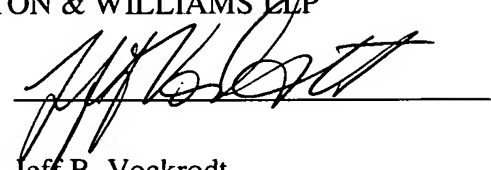
It is argued furthermore, the generic listing of possible zeolites. . . Y and mordenite. This is not persuasive because Applicant appears to admit that ferrierite is disclosed. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Applicant admits that ferrierite is listed as a possible support material in Ward and Farnos, but denies that the advantages of the present invention would flow naturally from anything suggested by these references. The Office Action cites language from *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985), which held that evidence to indicate that a shorter response time is obtained when a labyrinth heater is employed did not overcome a showing of obviousness that demonstrated that labyrinth heaters were suggested in the prior art. In contrast, the results of the present invention flow particularly from the claimed invention and none of the prior art shows a catalyst more similar to the claimed invention than the comparative examples in the specification. See *In re Grasselli*, 218 USPQ 769, 779 ("None of the prior art reviewed here, including McCellan, describes a catalyst more similar to that of claim 15 than those described in appellants' claims 6 or 7."). A proper consideration of the unexpected results in this application, which involve catalyst compositions, requires comparison of the claimed catalyst compositions with the prior art compositions that are actually disclosed or suggested. The fact that one can find all of the claimed elements disclosed in lists of possible catalyst materials is insufficient to establish a prima facie case of obviousness of a catalyst where there is nothing to guide the selection, much less show obviousness where evidence of unexpected results is present. Accordingly the rejection of claims 1 and 3-20 as obvious in view of Ward or alternatively Farnos is improper and must be withdrawn.

Applicant submits that this response addresses all of the issues raised in the Office Action and places the pending claims in condition for allowance. Should any issues remain to be discussed in this application, the undersigned may be reached by telephone. In the event any variance exists between the amount authorized to be charged to the Deposit Account and the Patent Office charges for reconsideration of this application, please charge or credit any difference to the undersigned's Deposit Account No. 50-0206.

Respectfully submitted,  
HUNTON & WILLIAMS LLP

By: \_\_\_\_\_

A handwritten signature in black ink, appearing to read "Jeff B. Vockrodt", is written over a horizontal line.

Jeff B. Vockrodt

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